# TECHNICAL INFORMATION SHEET

## DYNAFLOW® BRAZING FILLER METAL

**NOMINAL CHEMICAL COMPOSITION %:**

| | |
|---|---|
| Silver | 5.5 - 6.5 |
| Phosphorus | 5.9 - 6.2 |
| Copper | Remainder |
| Other (Total) | 0.15 |

**TYPICAL PHYSICAL PROPERTIES:**

| | |
|---|---|
| Solidus | 1190ºF (643°C) |
| Liquidus | 1470°F (799°C) |
| Density | 0.305 (lb./cu.in) |
| Electrical conductivity | 8.80 (% IACS) |

**BRAZING PROPERTIES:**

Dynaflow is a frequent choice for copper brazing. The phosphorus addition makes it "self-fluxing" on copper. Its wide melting range allows operators to fill loose connections and "cap", or build up, around the finished joint. When heated above its liquidus, however, it will penetrate tight connections.

Dynaflow is also a suitable choice to braze brass. In these applications, operators should take care to avoid over heating the brass and use Stay Silv® white brazing flux.

Dynaflow is a popular brazing filler metal for HVAC and refrigeration connections. It's melting range and copper joint strength makes it an excellent, lower cost, replacement for 15% silver alloys.

Dynaflow is not recommended for brazing steel or other ferrous base metals. The phosphorus content promotes formation of a low ductility intermetallic with the ferrous base metal.

**CORROSION RESISTANCE:**

Generally similar to the copper base metal, but phosphorus containing alloys, including Dynaflow, should not be used if the braze is exposed to sulfur or sulfur compounds in service.

**AVAILABLE FORMS:**

Standard wire diameters in, rods, spools, and preformed rings

**RECOMMENDED FLUX:**

No flux is required for copper brazing. For brazing, brass or copper to brass use Stay-Silv® white flux. Harris ECO SMART® boric acid free flux, (powder or paste), is an excellent choice to promote sound brazed assemblies and comply with European REACH requirements.

**SPECIFICATION COMPLIANCE:**

Manufactured to Harris Products Group engineering standards

**FATIQUE STRENGTH VS STAY SILV® 15**

A fatigue test protocol with an applied constant load and vibration was developed to evaluate brazed copper tube connections. The tests were conducted at room temperature and 300°F.

The image shows samples of brazed ¾" swaged tube connections. Twelve samples were brazed; six with Stay Silv 15 and six with Dynaflow. For each evaluated filler metal, three samples were tested at room temperature and three at 300°F. The center tube sample is the tube section prior to brazing.



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## Fatigue Test Data Summary Sheet

**Project No.:** 11322CSL-01 **Customer:** J.W. Harris

**Test Method:** Customer specified **Address:** The Harris Product Group, 4501 Quality Place, Mason, OH 45040

**Specification:** Customer Specified

**Job No.:** 2012-164963 **Technician:** Rich Minshall

**R-Ratio:** 0.1 **Run-Out:** ----

| | Specimen | Load Ratio | Applied Load | | | | Load Range | | Date Tested | Cycles | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Maximum (lb) | Minimum (lb) | Amplitude (lb) | Mean (lb) | (lb) | (N) | | | |
| 1 | 15-1 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/17/12 | 123,212 | 30 hz at 300°F |
| 2 | 15-2 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/17/12 | 84,856 | 30 hz at 300°F |
| 3 | 15-3 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/17/12 | 85,063 | 30 hz at 300°F |
| 4 | 15-4 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/13/12 | 122,123 | 20 hz |
| 5 | 15-5 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/16/12 | 171,720 | 30 hz |
| 6 | 15-6 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/16/12 | 125,838 | 30 hz |
| 7 | D-1 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/18/12 | 95,738 | 30 hz at 300°F |
| 8 | D-2 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/18/12 | 87,882 | 30 hz at 300°F |
| 9 | D-3 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/18/12 | 88,653 | 30 hz at 300°F |
| 10 | D-4 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/16/12 | 104,991 | 30 hz |
| 11 | D-5 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/16/12 | 88,453 | 30 hz |
| 12 | D-6 | 0.1 | 1,500.0 | 150.0 | 675.0 | 825.0 | 1,350 | 6,005 | 07/16/12 | 121,247 | 30 hz |

Samples Tested at 300° F

Test Conducted By Rich Minshall Title: Lead Technician

Reviewed By Title: Applications Engineer

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Standards, available from the U.S. Government Office, Washington, DC 20402.

**TEST RESULTS:**

Failure of all brazed samples was in the tube. The results indicate both alloys provide comparable strength, exceeding the copper tube strength, at both ambient and elevated temperature. These results are predicated on uniform clearance of approximately 0.002" – 0.005" and adequate braze alloy penetration into the capillary.

**SAFETY INFORMATION:**

WARNING: PROTECT yourself and others. Read and understand this information.
FUMES AND GASES can be hazardous to your health.
HEAT RAYS, (infrared radiation) from flame or hot metal can injure eyes.

- Before use, read and understand the manufacturer's instructions, Material Safety Data Sheets (MSDS), and your employer's safety practices.
- Keep your head out of fumes.
- Use enough ventilation, exhaust at the flame, or heat source, to keep fumes and gases from your breathing zone and the general area.
- Wear correct eye, ear, and body protection.
- See American National Standard Z49.1, *Safety in Welding, Cutting, and Allied Processes,* published by the American Welding Society,

**STATEMENT OF LIABILITY- DISCLAIMER:**

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